Impalement Injuries of the Hand

Repair of Damage from Broken Bean Poles

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• **A not uncommon injury of the hands among agricultural workers is impalement on the sharp ends of tomato-vine or bean-vine stakes that shatter as they are being driven. Careful debridement and tetanus prophylaxis are important in treatment. There are several simple precautions and changes in work methods that could greatly reduce the incidence of such injuries.**

INJURIES OF THE HAND caused by impalement on broken stakes happen principally in a few areas where wooden stakes are commonly used as support for tomatoes and pole beans. To drive them, agricultural workers use a tool made from a piece of iron pipe closed at one end and having handles extending along the tube at opposite sides. The top of the stake is inserted into the open end of the pipe, the handles are grasped in the hands and the stake is driven into the ground with a downsweep of the arms.

Injury occurs when a stake breaks and the momentum of the swing carries the worker's hand down upon the jagged end of the piece of the broken stake that is upright in the ground. Nearly all such injuries occur along the radial side of the hand and in a large proportion of them the thenar eminence or a more distal portion of the thumb is damaged. The piece of stake often pierces through soft tissue the full width of the hand, damaging tendons and nerves as well as muscles, but seldom is there fracture of bones. Because of the likelihood of contamination with tetanus organisms, thorough cleansing and careful debridement is essential.

The following case report describing such a hand injury and the method of treatment is typical of some forty similar cases observed in the past few years.

REPORT OF A CASE

A 42-year-old Mexican worker was driving stakes when one of them split and his hand, in downward sweeping, swung down upon the jagged end. A fragment 6 cm. by 1.5 cm.. was driven into the left thumb. The entire hand was carefully cleansed with an antibacterial emulsion (Phisohex) and water. Benzalkonium chloride (Zephiran) solution was used to rinse the wound. Lidocaine hydrochloride (Xylocaine) was injected along the tract of the splinter of wood and the tract was then laid open. The large wood fragment and several smaller pieces were removed. A culture was made of material swabbed from the tract made by the splinter. The tract was loosely closed with a single suture and a dry dressing applied.

After a negative reaction to a skin test for hypersensitivity, 10,000 units of tetanus antitoxin was administered intramuscularly and 0.5 cc. of tetanus toxoid subcutaneously. Aspirin-phenacetin-caffein tablets were prescribed for relief of pain. A sling was provided and the patient was advised to avoid using the hand.

On the following day, the wound was dry. There was a moderate amount of dried blood on the dressing. Three days after injury the wound seemed to be healing well. A new dressing was applied on the fourth day and on the sixth day the patient returned to work. A day later the stitch was removed.

The culture of material from the wound grew Gram-negative bacilli, probably pseudomonas, and Gram-positive bacilli resembling hay bacillus.

DISCUSSION

It is believed that injuries of the kind here described could be largely prevented if the following suggestions were carried out:

1. Wearing leather gloves would protect against penetration by some of the smaller fragments of wood.

2. In certain types of soil, holes can be made with a heavy crowbar to permit the introduction of stakes without the use of a driver.

3. If a driver must be used, a metal guard placed as a skirt below the handles of the driver, would protect the worker's hands.

Because of the likelihood of contamination with tetanus spores, careful debridement and large doses of tetanus antitoxin are required (after skin test with diluted material) for patients not actively immunized with tetanus toxoid.

Tissue response to stakes treated with creosote or with other preservatives may differ from the response to untreated wood. In two cases known to the author, large pieces of wood remained imbedded in tissue, with minimal reaction, over a period of weeks. The likelihood of multiple fragments of wood in this kind of injury should be kept in mind.

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